

Instrumentation & Data Acquisition System (DAS) Engineer

National Aeronautics and
Space Administration



Markus Deon Jackson

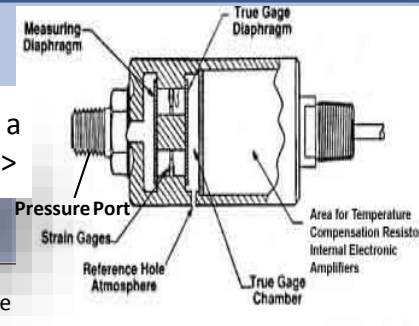
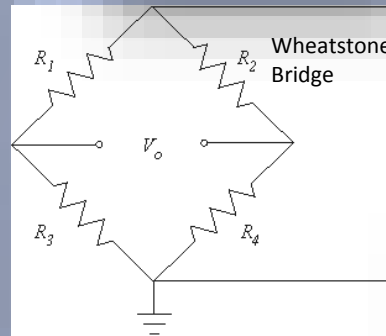
Electrical Engineering/College of Science, Engineering & Technology, Jackson State University

The primary job of an Instrumentation and Data Acquisition System (DAS) Engineer is to properly measure physical phenomenon of hardware using appropriate instrumentation and DAS equipment designed to record data during a specified test of the hardware. A DAS system includes a CPU or processor, a data storage device such as a hard drive, a data communication bus such as Universal Serial Bus, software to control the DAS system processes like calibrations, recording of data and processing of data. It also includes signal conditioning amplifiers, and certain sensors for specified measurements. My internship responsibilities have included testing and adjusting Pacific Instruments Model 9355 signal conditioning amplifiers, writing and performing checkout procedures, writing and performing calibration procedures while learning the basics of instrumentation.

Introduction

- A Data Acquisition System (DAS) is used to gather, process, and analyze data regarding temperature, pressure, and voltage, among others
- A few types of Instrumentation used with the DAS system are pressure transducers, Resistance Temperature Devices (RTD) and thermocouples
- Pacific Instruments Model 9355 signal conditioning amplifiers are used to provide excitation voltage to an instrument and/or filter and gain to the signal of a measured parameter
- Transducers convert a physical measurement into an electrical signal, such as pressure>strain>voltage>Engineering Unit of Pressure

1.) A cross section of a pressure transducer. >



< 2.) Schematic of a typical Wheatstone bridge circuit used in bridge type transducers

Objectives

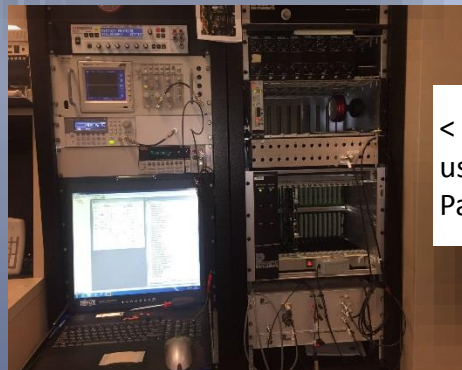
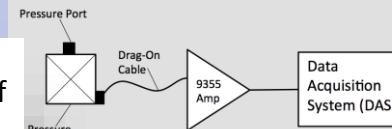
Objective is to test, adjust, and/or repair the issues associated with the Model 9355 amplifiers.

My contribution is:

- benefitting Stennis Space Center's DAS Upgrade Project allowing the engineers to focus on other aspects of the Upgrade Project
- providing the team with reliable hardware that is being used to operate the DAS system during integrated checkouts and future test projects

The Upgrade Project is integrating and combining the heritage hardware with the newer DAS hardware. Together, this system will retain the dependability of the heritage equipment and provide reliability and better capability with the new equipment.

End-to-End diagram of the of a pressure measurement. >

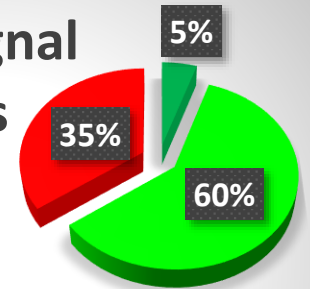


< Photo of ACS2000 system used to test and verify Pacific 9355 amplifiers

Outcomes

260 Verified Signal
Conditioners

- Passed
- Repaired
- Failed



Summary

- 60% of all amplifiers tested passed with little adjustments
- 5% of all amplifiers tested required no adjustment
- Failed amplifiers made up the remaining 35% and will require additional repair and testing
- The type of failure for each failed amplifier will determine the additional repair and testing